Management and monitoring the diabetic cat

Reusch, Claudia E

MANAGEMENT AND MONITORING OF THE DIABETIC CAT

Prof. Dr. Claudia Reusch, Dipl ECVIM-CA
Clinic for Small Animal Internal Medicine, Winterthurerstrasse 260, 8057 Zurich,
creusch@vetclinics.uzh.ch

The primary goal of treatment is to eliminate the clinical signs of diabetes (e.g. polyuria, polydipsia, polyphagia, weight loss), to prevent complications (e.g. hypoglycaemia, DKA) and to increase the chance of diabetic remission. Another goal is to minimize the potential negative impact of the cat's disease on the owner and thereby avoid cessation of therapy or euthanasia. The factors with the most negative impact on quality of life are boarding difficulties, owners wanting more control on diabetes, difficulties leaving cat with friends or family, general worry about diabetes, worry about hypoglycaemia, adapting social life, diabetes-related costs and adapting work life. The veterinarian should make amendments to the protocol accordingly, e.g. simplification of treatment if social life, work life or costs are the major problems, access to home monitoring of blood glucose (HM) if owner wants more control and avoidance of tight glucose regulation if owner is worried about hypoglycaemia. After diagnosing the disease (by means of appropriate clinical signs, hyperglycemia, increased fructosamine), further work-up should clarify the severity of diabetes and the presence of concurrent disease (e.g. urinary tract infection, stomatitis, pancreatitis). Insulin is the mainstay of treatment in diabetic cats. Currently available non-insulin antidiabetic medications have either a rather low success rate, are not suitable as monotherapy or have not yet been adequately evaluated in diabetic cats. Feeding a low-carbohydrate-high-protein diet is considered to be advantageous and may increase remission rates. Some cats, however, refuse eating a particular diet, often times adequate glycemic control may still be achieved by feeding the usual food. In the vast majority of diabetic cats, dietary measures alone are insufficient to get control over the disease. Treatment should be initiated immediately and generally include twice daily insulin application (e.g. Lantus®, ProZinc®, Caninsulin®) and high-protein-low-carbohydrate diet. At our institution, we start with an initial insulin dose of 1 U/cat BID in cats weighing $\leq$ 4 kg and 1.5 – 2.0 U/cat BID in cats weighing > 4kg. In cats with a blood glucose concentration < 20 mmol/l at the time of diagnosis, no more than 1 U/cat BID is given, independent of the body weight. Diabetogenic drugs (glucocorticoids, progestagens) should be ceased whenever possible. Initially, frequent re-evaluations are mandatory to titrate the insulin dose, to avoid oversight of diabetic remission and to identify cats with difficult to regulate diabetes requiring further work-up. Re-evaluations should be scheduled as a minimum after 1, 2-3, 6-8, 10-12, 14-16 weeks after initiating treatment, thereafter, the frequency can be reduced to approximately every 4 months. Measures taken at each re-evaluation include review of the daily log of the owner (including results of HM), evaluation of body weight, physical examination, measurement of serum fructosamine and generation of a blood glucose curve (BGC). To minimize the influence of lack of food intake on the result of the BGC, the owner should give insulin and food at home, and then bring the cat to the hospital as soon as possible (within 2 hours). Thereafter, glucose is measured every 2 hours (or every 1 hour if hypoglycaemia is suspected) for at least 10 hours. In-hospital BGCs are prone to be affected by stress and consequently, blood glucose concentrations may rise continuously throughout the day or glucose levels may be high from the beginning. Lack of food intake in cats used to eat frequent meals has the opposite effect as it may result in low blood glucose concentrations. In-hospital BGCs should therefore be interpreted with great caution. In cats in which owners perform HM on a regular basis, generation of in-hospital BGCs can be omitted. Fructosamine concentrations roughly reflect the quality of glycemic control of the previous 1 to 2 weeks. The parameter is neither affected by short term increase in blood glucose concentration (e.g.

stress hyperglycemia) nor by lack of food intake. Reference ranges of fructosamine differ to some degree between laboratories. If a normal fructosamine is found, careful evaluation of the cat (including BGCs, best generated at home) should be done to check for hypoglycemia and/or diabetic remission. If fructosamine is high (e.g. > 550 µmol/l), the various possible reasons for poor regulation have to be considered (e.g. application error, insulin underdose, too short duration of insulin effect, Somogyi phenomenon, concurrent diseases causing insulin resistance). The parameter is less important than the evaluation of clinical signs and body weight and generation of BGCs. Measurement of fructosamine is helpful to get an overall impression on the quality of glycaemic control, to clarify the effect of stress on blood glucose concentrations and to clarify discrepancies between the history, physical examination findings, and BGCs. Monitoring at home is as important (resp. even more important) than monitoring in the hospital. The owner should log well-being, water and food intake, insulin dose daily and body weight once per week. HM is strongly encouraged as it provides more reliable information than blood glucose measured in the hospital. The majority of owners are able to learn to do HM and appreciate to have more control over the disease. HM is particular helpful to identify hypoglycaemia, which occurs quite frequently in cats experiencing diabetic remission. Owners should be introduced to HM as fast as possible after initiating therapy (e.g. during the first or second re-evaluation). Teaching capillary blood sampling with a lancing device and the use of a portable glucose meter (PBGM) should take at least 30 minutes and should be done by an experienced technician or veterinarian. Capillary blood may be obtained from various sites, such as pinna, metacarpal and metatarsal pads interchangeable. Only PBGM for which independent quality control studies have been performed should be used. To generate a BGC, the glucose concentration before the morning insulin injection should be measured and every 2 hours thereafter until the evening insulin injection is due. Hourly measurements should be suggested if hypoglycaemia is suspected. Many owners need additional support (e.g. by telephone) during the initial phase of performing HM and it is important that veterinary help is readily available. During the first 3-4 months of therapy a BGC should be generated approximately every 5 to 7 days. After stabilisation (and if no remission is achieved) the time intervals can be prolonged to every 3 – 4 weeks. Additionally, the fasting blood glucose should be measured twice weekly and a spot glucose check performed whenever the owner feels uncertain about the well-being of the cat. It has to be considered that HM may pose an additional burden on the owner and the veterinarian needs to evaluate carefully if and when an owner is prepared for the procedure. Owners who are unable to perform HM may use urine glucose measurements in all urine samples voided throughout one day per week. Results should only be used as a rough estimate and insulin dose should not be amended based on urine glucose measurements. Persistent glycosuria suggests inadequate control, lack of glucose can be due to excellent glycaemic control, diabetic remission or insulin overdose. Cats in which clinical signs have resolved and body weight is stable are usually well controlled, whereas persistence of clinical signs and unwanted weight loss is suggestive of poor glycemic control or the presence of another disease. BGCs are essential for the fine-tuning of insulin dose, to detect hypoglycemia (as cats often do not show clinical signs until blood glucose is extremely low), to tailor the insulin dose in case of diabetic remission and to identify the exact problem in case of poor glycemic control. During the first 3-4 months of therapy, the interpretation of BGCs and treatment decision should be made by the veterinarian. During long-term management, many owners gain sufficient experience to make (slight) dose adjustments on their own according to written guidelines. See presentation “Which insulin in cats?” for more details on insulin preparations and dose adjustment.

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